REMARKS

Applicant proposes that the instant claim amendments removes the grounds for Examiner's prior claim rejections in this application. Independent claims 19, 41 and 44 have all been amended to address the Examiner's rejections. Neither of the Examiner's alternate readings of Tsuzuki et al meets the claim limitations of the independent claims as now amended.

The applicant would like to state some observations.

1. Amended claim 31 and new claims 45 and 46 employ a limitation characterizing structure as "monolithic". Here "monolithic" is used in its common industrial usage as a body that is "seamless" or formed of a single material. Support for this limitation can be found in Figures 56 – 61 and the corresponding discussion of these Figures.

2. The limitation of a metal being an "electrodeposit" or "electroplate" is employed in dependent claims 37, 38, 46, and 49. In the Office Action of October 11, 2007, the Examiner advanced a position that "Undue (weight) cannot be given to the limitation to the metal of the second pattern being "electrodeposited", because this limitation is drawn only to the formation of a product by a specified process." Applicant disagrees with the Examiner's position here because electroplating results in a material structure which cannot be practically produced by any alternate method.

- The characterization "electrodeposited" or "electroplated" clearly conveys a unique macro-structural connotation. The dictionary definition of "electroplate" is to coat a surface with metal by electrolysis. Thus the understanding in the art, and indeed the "plain language" meaning, of "electroplate" is a thin coating covering a supporting substrate and having a thickness far less than the linear dimensions of its surface. Further, an electroplated metal coating conforms to and closely replicates the surface on which it is deposited.
- Since an electroplate is supported by a substrate, complex patterns of metal which would not be intrinsically self-supporting and processable are possible with electroplates.
- The adjustable high surface to weight ratios, surface properties and material choices associated with electrodeposits permit electrical trace designs which cannot be produced any other way. An electroplate gives broad and conformable surface contact to an abutting surface to minimize contact resistance. Compare this situation for example, with the "line contact" achieved using a wire of the same cross section.
- Additionally, electrodeposited metals have unique, distinct and characteristic microstructure to produce special properties such as surface smoothness, softness, ductility and variations in internal stress, all factors in achieving excellent ohmic contact to an abutting surface.

- Vacuum metallizing is another form of "metal deposition". However, vacuum deposition is non-selective. To achieve a selective deposit, a mask must be used. Using a mask in vacuum processing is seldom, if ever, practical. In addition, vacuum deposits of thickness greater than about 1 micrometer are reportedly difficult to achieve. Such a thickness is too little to be of use for an efficient current collector grid.

- Chemical metal deposition is yet another form of "metal deposition" However, practical chemical deposition is relatively slow (an order of magnitude less than practical electrodeposition). In addition, chemical deposits often include characteristic impurities, such as phosphorous, which negatively impact properties. Indeed, chemically deposited metal films are often combined with electrodeposited overcoatings to achieve desired results.

Applicant avers that electroplated metal is uniquely suitable for the instant teachings and other metal forms could not be equivalently substituted for electroplated metal. Thus, applicant further avers that "electrodeposited" or "electroplated" metal is a proper structural limitation.

3. In the October 11, 2007 Office Action the Examiner states in Paragraph 7 that "Sawayama et al teach adhering a conductive member (15) to the transparent conductive surface of a solar cell (11) using a low-melting solder (17) which can be an indium containing solder" Applicant disagrees with Examiner's conclusion here.

The Examiner refers to Figure 3 and the discussion from Column 13, line 5 through Column 14, line 9. It is true that Figure 3 shows a small amount of edge contact between the "low melting point" layer 17 and transparent electrode 11. However, it is clear from the remaining specification that this contact results only from the thickness of the layer 17 and achieving adhesion of the material 15 from this incidental contact is not taught by Sawayama et al. Applicant refers specifically to Figures 1, 10, 11, 18 and 29 showing idealized sectional views of the Sawayama et al structure. There, no such contact between the "low melting point" overcoat and the transparent electrode is shown. Indeed, it is stated that a goal is to keep the "low melting point metal" off the transparent electrode. See for example the discussion of Examples 7 and 10. This is achieved as shown in Figures 5A-5G and 6A-6G by a "pull back" of the molten solder material from the transparent electrode surface to the "conductive polymer" surface. The intent is to concentrate the "low melting point" solder on top of the "conductive polymer" trace to increase conductivity while holding the shading to a minimum. There is no teaching that contact of the "low melting point" solder to the transparent electrode increases adhesion of the conductive trace to the transparent electrode. Indeed, it is clearly stated that the solder only poorly wets the transparent electrode to result in the pull-back (see for example column 20, line 60 to column 21, line 7.

Presently amended claims 39 and 40 depending from amended claim 19 call for a "low melting point metal based material". However, since the claims 39 and 40 depend from amended claim 19, the "low melting point material" must be positioned between the first material and the conductive or semi-conductive surface. This is clearly not the case in the Sawayama et al disclosure. Indeed, at Column 5, lines 39 – 42 of the Sawayama et al disclosure, it states "…the metal member covers a portion on the bound conductive member except for a junction surface between the bound conductive member and the semiconductor". The metal member of Sawayama et al is the "low melting point material".

The Examiner has taken a position that "low melting point metal based material" is relative, and that silver has a low melting point compared to copper. Applicant argues that "low melting point metal and alloys" is common description in the art for metals typically used as solders, and comprise the very materials identified by Sawayama et al as "low melting point" materials. Also, the instant specification teaches that the "low melting point metal based materials" of the instant invention would melt during the plastics lamination process depicted in Figure 60. One knowledgeable in the art would readily recognize that such lamination would be practiced at temperatures less than about 500 degree F.

Applicant states that the instant amendments to the claims bring them into condition for allowance. Following entry, claims will consist of independent claims 19, 41 and 44 and independent claims 20-22, 26-27, 29, 31-40, and 45-50. Total claims will be 25. It is applicants understanding that no additional fee is required. Entry of the instant Amendment and the Issuance of a Notice Of Allowance is respectfully requested.

Should the Examiner have questions suggestions or comments which would assist in allowance, please contact the Applicant at the contact information below.

Respectfully submitted,

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